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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,327	06/30/2003	Robert Bruce Darling	UWOTL121266	3726
26389	7590	04/26/2005	EXAMINER	
CHRISTENSEN, O'CONNOR, JOHNSON, KINDNESS, PLLC 1420 FIFTH AVENUE SUITE 2800 SEATTLE, WA 98101-2347			SOUW, BERNARD E	
			ART UNIT	PAPER NUMBER
			2881	

DATE MAILED: 04/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/611,327	Applicant(s) DARLING ET AL.	
	Examiner Bernard E. Souw	Art Unit 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 and 40-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23, 26-31 and 40-45 is/are rejected.
- 7) ☒ Claim(s) 24 and 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>06/03-01/04-02/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Preliminary Amendment

1. The Preliminary Amendment filed 06/30/2003 has been entered.

The present Office Action is made with all the suggested amendments being fully considered.

The specification has been amended by inserting on page 1 cross reference information regarding a related application No. 09/744,360.

Claims 59-88 have been cancelled.

Pending in this Office Action are claims 1-58.

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-31 and 40-45, drawn to a charged particle (CP) source, analyzer and/or detection system, classified in class 250, subclass 315.3 to 504H.
 - II. Claims 34-39, drawn to process of measuring CP beam intensity, classified in class 250, subclass 461.1, 472.1-488.1 and 493.1-504R
 - III. Claims 32, 33 and 46-58, drawn to method of making a metal and/or semiconductor structure, classified in class 29, subclass 1-905 and/or class 438, subclass 1-983.
3. Inventions I (CP source and detection system) and II (CP beam intensity measurement method) are related as apparatus and process. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by

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another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)).

In this case (a) the process as claimed can be practiced by hand, wherein the electronic multiplexing is accomplished by manual switching of electric/electronic contacts.

4. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

Unrelated Inventions

5. Inventions I and III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects. (MPEP § 806.04, MPEP § 808.01).

In the instant case the different inventions of a CP system and a method of making a metal and/or semiconductor structure belong to different classes having different modes of operation, different functions, or different effects.

6. Inventions II and III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects. (MPEP § 806.04, MPEP § 808.01).

In the instant case the different inventions the different inventions of a method for measuring CP beam intensity and a method of making a metal and/or semiconductor structure belong to different classes having different modes of operation, different functions, or different effects.

Conclusion to All Restriction Requirements: Different Classification

7. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Election by Phone

8. During a telephone conversation on 04/14/2005 with Applicant's Attorney, Mr. George Renzoni, Reg. No. 37,919, a provisional election was made with traverse to prosecute the invention of Group I, claims 1-31 and 40-45. Affirmation of this election must be made by applicant in replying to this Office action. Claims 32-39 and 46-58 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Divisional Status

9. This application appears to be a division of Application No. 09/744,360, filed 01/22/2001, now US Patent No. 6,847,036. Accordingly, the corresponding statement

on page 1 (modified per 06/30/2003 amendment) is to be updated when replying to this Office action.

Priority

10. Receipt is acknowledged of papers submitted under 35 U.S.C. 371 (PCT/US99/23307). However, a certified copy has not been received with the present application, or with the parent application No. 09/744,360.

Information Disclosure Statement

11. Receipt is acknowledged of information disclosure statements (IDSs) submitted on 06/30/2003 (IDS #1), 01/30/2004 (IDS #2) and 02/07/2005 (IDS #3). The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Specification

12. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objection

13. Claim 45 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent on any one of claims 32-39, which have been cancelled/non-

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elected. See MPEP § 608.01(n). Accordingly, the claim 45 has not been further treated on the merits.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

15. Claims 1, 4, 5, 6, 8, 11, 26, 40, 43 and 44, are rejected under 35 U.S.C. 102(a) and (e) as being clearly anticipated by Tracy et al. (USPAT 6,180,942).

Tracy et al. disclose in Figs.2-4 a charged particle detection system, comprising:

(a) an electronic multiplexing unit connected to 40 in proximity to (b) a plurality of charge-collecting zones 34, wherein each charge-collecting zone 20 shown in Fig.2 comprises a conductive material for receiving (34) and storing (38) charge shown in Figs.3-4, wherein each charge-collecting zone 34 is isolated and electrostatically shielded from neighboring charge-collecting zones by a separator comprising an insulated electrical conductor 38 held at a reference potential, as shown in Fig.4, wherein each charge-collecting zone 38 is electronically interfaced to the multiplexing unit connected to 40, as shown in Fig.3A and wherein the multiplexing unit is interfaced

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to a means for measuring the charge collected by the charge-collecting zones, as recited in Col.4/II.6-65.

► Regarding claim 4, Tracy's detector array comprises insulating layers 35 and conducting layers 34 shown in Fig.4, as recited in Col.4/II.23-58.

► Regarding claim 5, Tracy's insulating layer comprises a high dielectric strength, low leakage material, as recited in Col.2/II.28-31 in view of Col.2/II.14-17.

► Regarding claim 6, Tracy's conducting layer 34 in Fig.4 is made of aluminum (see label).

► Regarding claim 8, Tracy's separator 32 (silicon) supports the charge collecting zones 38, as shown in Fig.4.

► Regarding claim 26, Tracy's separator, charge-collecting zones 34, multiplexing unit and means for measuring the charge (connected to 40), are mounted on a single substrate 32 (silicon), as can be seen in Fig.4.

► Regarding claim 40, a charged particle (CP) source is shown in Fig.7 by numeral 66, as recited in Col.5/II.51-52.

► Regarding claims 11, 43 and 44, Tracy's charge-collecting zone(s) comprises a Faraday cup (array), as recited in Col.1/II.30-31.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 17, 18 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tracy et al.

Tracy et al. show all the limitations of claims 17 and 18, as previously applied to the parent claim 1, also including the limitation of absolute ion currents of very small magnitudes, as recited in Col.2/ll.49-51.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Tracy's detector array to measure absolute ion currents from about 0.2 pA to about 1.4 μ A, as recited in the claims, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

One of ordinary skill in the art would have been motivated to specify the range of current being measured with Tracy's apparatus to between about 0.2 pA to about 1.4 μ A in order to commensurate with the actual need.

► Regarding claims 29-31, the limitations are inherent in the size limitations recited in Col.3/ll.18-21 in view of Col.1/ll.30-31.

18. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tracy et al. in view of Stine (USPAT 4,720,706).

Tracy et al. show all the limitations of claims 2 and 3, as previously applied to the parent claim 1, except the recitations of using a "gray-code" and "greater than 98% read-out duty cycle".

Stine describes a digital read-out method for an array that is also applicable to Tracy's array, as generally understood in the art. Using a "gray-code" to express any intensity is conventional in most digital methods, as taught by Stine in Col.5/ll.15-26, more specifically by the term "intensity shading" in Col.5/ll.25-26. Stine's read-out method also has a high duty cycle in the order of greater than 98%, as specifically recited in Col.15/ll.7-15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a gray code to read the ion current intensity of Tracy's array, in order to obtain information not only about the presence of a current, but most importantly, also its magnitude.

One of ordinary skill in the art would have been motivated to use Stine's method of high duty cycle on Tracy's detector array, since high duty cycles are also efficient.

19. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tracy et al. in view of Frank et al. (USPAT 5,994,694).

Tracy et al. show all the limitations of claim 7, as previously applied to the parent claim 1, except the recitation of aluminum oxide as insulating layer.

Frank et al. disclose a detector array similar to Tracy's, in which aluminum oxide is specifically used as insulating layer, as recited in Col.7/ll.30-34

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use aluminum oxide as insulating layer, since aluminum oxide is known in the art as having a high electrical resistance.

One of ordinary skill in the art would have been motivated to modify Tracy's device by adopting Frank's aluminum oxide as insulating layer, since a high electrical resistance is desirable to better isolate the detector from each other, thus preventing a cross talk in reading.

20. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tracy et al. in view of Freidhoff et al. (USPAT 5,386,115)

Tracy et al. show all the limitations of claims 9 and 10, as previously applied to the parent claim 1, except the recitation of copper, chromium or gold as conductive material made by vapor deposition method.

Freidhoff et al. disclose an ion detector array similar to Tracy's. Freidhoff's conductive material is made of gold, as recited in Col.5/ll.12-15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use gold as conductive material because of its high electrical conductivity, non-corrosive and non-magnetic properties.

One of ordinary skill in the art would have been motivated to use materials of high conductivities in order to minimize the losses, especially at very low current levels.

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21. Claims 11-16, 19-23, 27, 28, 41 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tracy et al. in view of Benveniste et al. (USPAT 5,198,676).

Tracy et al. show all the limitations of claims 11-16, 19, 20-22, 23, 27, 28, 30, 41 and 42, as previously applied to the parent claims 1 and 40, except for specific limitations to be individually addressed as follows:

► Regarding claims 11-16, the recitation of using Faraday cups as charge collecting zone(s) is already recited by Tracy et al. in Col.1/ll.30-31. More specifically, Benveniste et al. make use of Faraday cup(s) as shown in Fig.3 and Fig.8, as recited by Benveniste in Col.1/ll.57-59, Col.2/ll.52-55 and Col.4/ll.22-25.

- Specifically regarding claim 12, an aspect ratio of about 2:1 can be seen in Benveniste's Fig.3.
- Specifically regarding claim 14, a linear array (of Faraday cups) is recited by Benveniste et al. in Col.9/ll.12-17.
- Specifically regarding claims 13 and 15, a two-dimensional array is shown by Benveniste et al. in Fig.8.
- Specifically regarding claim 16, a stack of Faraday cups can be seen in Tracy's Fig.6 (numerals 30A to D) in combination with Col.1/ll.30-31.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Faraday cups as charge collecting zone(s) since it is already suggested in the primary reference (Tracy et al.) in Col.1/ll.30-31.

One of ordinary skill in the art would have been motivated to modify Tracy's Faraday cup(s) specifically with Benveniste's various Faraday cups arrangements, in

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order to better meet the geometrical condition(s) of the spatial distribution of the ion beam to be measured.

► Regarding claims 19 and 20, the recitation of 2^n zones with large values of n is already recited by Tracy et al. in Col.4/II.53-57, whereas 64 and 256 zones are specifically recited by Benveniste et al. in Col.5/II.23-25 and Col.7/II.10-11.

► Regarding claim 21, operational amplifier(s) is shown in numeral 260, Fig.10, by Benveniste et al., as recited in Col.6/II.6-8.

► Regarding claims 22 and 41, the recitation of a mask is recited by Benveniste et al. in Col.2/II.53-55 in reference to Fig.8.

► Regarding claims 23 and 42 the recitation of a suppressor grid is recited by Tracy et al. in Col.2/II.63-67 and further, in Tracy's claims 6 and 11.

► Regarding claims 27 and 28, the recitation of a PC board having traces electrically connected to the charge collection zones is recited by Benveniste et al. in Col.6/II.30-33.

Indication of Allowable Subject Matter

22. Claims 24 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Reasons for Indication of Allowable Subject Matter

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23. The following is a statement of reasons for the indication of allowable subject matter:

A detector array for measuring ion currents of low magnitudes, further comprising means for increasing the temperature of the detectors and controlling the temperature of the system, has neither been anticipated nor rendered obvious by any prior art.

Relevant Prior Art

24. This prior art made of record and not relied upon is considered pertinent to applicant's disclosure: USPAT # 6,815,668, issued to Miller et al. on 11/09/2004 (filed 03/05/2001) and USPAT 6,806,463, issued to Miller et al. on 10/19/2004 (filed 12/16/2002), are found to claim the same subject matter as the present invention, also including the limitation of increasing and controlling the temperature of the detector system. However, the filing dates of the two cited references are predated by the earliest priority date of the present invention, i.e., 01/22/1999 (provisional application), and are therefore inapplicable as prior art.

Double Patenting

Non-Statutory Type Double Patenting

25. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11

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F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Obviousness Type Double Patenting

26. Claims 11, 13, 14, 15, 16 and 30 (dependent on claim1) as well as claims 40 and 43-45 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 9, 18, 19, 26 and 27 of U.S. Patent No. 6,847,036. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

(a) The limitation of a plurality of Faraday cups in the present claims is the same as the limitation (a) of claims 1, 9 and 19 of the reference US Patent No. 6,847,036.

(b) The limitation of insulated conductor held at reference potential of the present claims is the same as the limitation (b) of claims 1, 9 and 19 of the reference US Patent.

(c) More specifically, the linear array of claim 14 is the same as the same limitation in claim 26 of the reference US Patent.

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(d) More specifically, the 2 dimensional array of claim 15 is the same as the same limitation in claims 18 and 27 of the reference US Patent.

27. Claims 6 and 9 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2, 4, 10 and 11 of U.S. Patent No. 6,847,036. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

- ▶ The limitation of aluminum in the present claim 6 is the same as in claim 2 of the reference U.S. Patent.
- ▶ The limitation of copper, chromium and gold in the present claim 9 is the same as in claim 4 and 11 of the reference U.S. Patent.
- ▶ The combined limitation of aluminum, copper, chromium and gold in the present claims 6 and 9 is the same as in claim 10 of the reference U.S. Patent.

28. Claim 7 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 13 of U.S. Patent No. 6,847,036. Although the conflicting claims are not identical, they are not patentably distinct from each other because the limitation of aluminum oxide in the present claim is the same in claim 13 of the reference US Patent.

29. Claims 19 and 20 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 7, 16, 24 and 8,

17, 25, respectively, of U.S. Patent No. 6,847,036. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

- ▶ The limitation of 2^n channels in the present claim 19 is broader than the limitations in claims 7, 16, and 24 of the reference U.S. Patent.
- ▶ The limitation of 256 channels in the present claim 20 is the same as in claims 8, 17 and 25 of the reference U.S. Patent.

30. Claim 27 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 14 and 15 of U.S. Patent No. 6,847,036. Although the conflicting claims are not identical, they are not patentably distinct from each other because the limitation of printed circuit board having traces in the present claim is the same as in claim 14 and 15 of the reference US Patent.

31. Claim 31 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 30 of U.S. Patent No. 6,847,036. Although the conflicting claims are not identical, they are not patentably distinct from each other because the limitation of 100 μm unit cell size in the present claim is about the same as the range 100 μm to 500 μm cell pitch in claim 30 the reference US Patent.

Communications

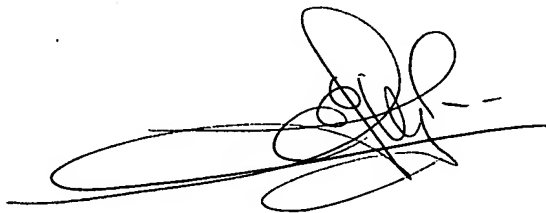
32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard E Souw whose telephone number is 571 272

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2482. The examiner can normally be reached on Monday thru Friday, 9:00 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 571 272 2477. The central fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for regular communications as well as for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

A handwritten signature in black ink, appearing to read 'Bernard E. Souw', with a long horizontal line extending to the left.

Bernard E. Souw

Patent Examiner – AU 2881

April 21, 2005